In the claims:

1. In a multiple-input, multiple-output communication system having a receiving station that receives at least a first data vector transmitted thereto upon a communication channel, the at least the first data vector formed of received symbols, an improvement of apparatus for operating upon the data vector, once received at the receiving station, said apparatus comprising:

at least a first processing element coupled to receive indications of the at least the first data vector received at the receiving station, said first processing element for forming optimized feedforward filter parameters and optimized feedback filter parameters, the optimized feedforward and feedback filter parameters used to perform interference cancellation and prefilter operations at the receiving station.

2. The apparatus of claim 1 wherein the receiving station further comprises at least a first feedforward filter coupled to receive indications of the at least the first data vector, wherein said first processing element is coupled to the first feedforward filter, and wherein the optimized feedforward filter parameters formed by said first processing element are provided to the first feedforward filter, values of the optimized feedforward parameters used at the first feedforward filter to define filter characteristics of the first feedforward filter and feedforward filtering operations performed upon the indications of the first data vector.

3. The apparatus of claim 2 wherein the at least the first data vector comprises the first data vector and at least a second data vector, wherein said at least the first processing element comprises the first processing element and at least a second processing element, wherein

the at least the first feedforward filter comprises the first feedforward filter and at least a second feedforward filter, said second processing element coupled to the second feedforward filter, optimized feedforward parameters formed by said second processing element provided to the second feedforward filter, values thereof used at the second feedforward filter to define filter characteristics of the second feedforward filter.

4. The apparatus of claim 1 wherein the receiving station further comprises at least a first feedback filter coupled to receive indications of the at least the first data vector, wherein said first processing element is coupled to the first feedback filter, and wherein the optimized feedback filter parameters formed by said first processing element are provided to the first feedback filter, values of the optimized feedback parameters used at the first feedback filter to define filter characteristics thereof.

5. The apparatus of claim 4 wherein the at least the first data vector comprises the first data vector and at least a second data vector, wherein said at least the first processing element comprises said first processing element and at least a second processing element, wherein the at least the first feedback filter comprises the first feedback filter and at least the second feedback filter, said second processing element coupled to the second feedback filter, optimized feedback parameters formed by said second processing element provided to the second feedback filter, values thereof used at the second feedback filter to define filter characteristics of the second feedforward filter.

6. The apparatus of claim 4 wherein the receiving station further comprises at least a first feedforward filter coupled to received values representative of the first data vector, wherein said first processing element is coupled to the first feedforward filter and wherein the optimized feedforward filter parameters formed by said first processing element are provided to the first feedforward filter, values of the optimized feedforward parameters used at the first feedforward filter to define filter characteristics of the first feedforward filter, the first feedforward filter forming a first feedforward-filtered signal, the first feedforward-filtered signal forming the indications of the at least the first data vector.

7. The apparatus of claim 6 wherein the receiving station further comprises a sequence estimator and wherein the first feedback filter to which the optimized feedback parameters formed by said first processing element are provided form part of the sequence estimator.

8. The apparatus of claim 7 wherein the first feedforward filter to which the optimized feedforward parameters are provided by said first processing element form part of the sequence estimator.

9. The apparatus of claim 8 wherein application of the optimized feedforward and feedback parameters, respectively, to the feedforward and feedback filters, respectively, permits concurrent interference cancellation and prefilter operations to be performed at the sequence estimator.

10. The apparatus of claim 8 wherein the sequence estimator to which the feedforward and feedback parameters are provided by said first processing element comprises a decision feedback sequence estimator having a maximum likelihood sequence estimator to which the feedback filter is connected in a feedback arrangement.

11. The apparatus of claim 1 wherein the receiving station comprises a plurality of receive antenna elements and wherein said at least first processing element comprises a plurality of processing elements, said plurality of processing elements at least corresponding in number with the plurality of receive elements.

12. The apparatus of claim 11 wherein the receiving station is further comprised of a plurality of receive-chain portions, the plurality of receive-chain portions corresponding in number with the number of processing elements of said plurality of processing elements, a processing element of said plurality of processing elements forming part of each receive chain of the plurality of receive chains.

13. In the multiple-input, multiple-output communication system of claim 1 wherein the at least the first data vector is transmitted to the receiving station by a sending station, a further improvement of apparatus for the communication system, said apparatus comprising:

a joint encoder coupled to data that is to be sent to the receiving station, the send data formed of at least a first and a second data sequence, said joint encoder for jointly encoding the at least the first and second data sequences.

14. The further apparatus of claim 13 wherein said joint encoder further comprises a data puncturer for puncturing the encoded data encoded thereat.

15. The further apparatus of claim 14 wherein said joint encoder further comprises an interleaver for interleaving the encoded punctured data thereat.

16. In the multiple-input, multiple-output communication system of claim 15 wherein the apparatus for operating upon the data vector, once received at the receiving station, further comprises a joint decoder for performing joint decoding operations upon data representative of at least the first data vector.

17. In a method of communicating in a multiple-input, multiple-output communication system having a receiving station that receives at least a first data vector and transmitted thereto upon a communication channel, the at least the first data vector formed of received symbols, an improvement of a method for operating upon the data vector, once received at the receiving station, said method comprising:

forming optimized feedforward filter parameters and optimized feedback filter parameters;

applying the optimized feedforward filter parameters to a feedforward filter to define filter characteristics of the feedforward filter;

applying the optimized feedback filter parameters to a feedback filter to define filter characteristics of the feedback filter; and

concurrently performing interference cancellation and prefiltering operations through operation of the feedforward and feedback filters, respectively.

18. The method of claim 17 further comprising the operations, prior to said operation of forming, of:

jointly encoding input data at the sending station; and

transmitting the data, once encoded, to the receiving station.

19. The method of claim 18 comprising the further operation of jointly decoding indications of the at least the first data vector subsequent to performance of interference cancellation and prefiltering operations.

20. The method of claim 19 wherein said operation of concurrently performing the interference cancellation and prefiltering is performed at a decision feedback sequence estimator.